

**REVIEW**  
**of**  
**Wisconsin's Lake Sturgeon**  
**Management Plan (2000)**



**Drafted by current (2017) members of the WDNR Sturgeon  
Management Team**

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# INTRODUCTION

Lake Sturgeon management activities are currently guided by the 2000 Lake Sturgeon Management Plan. The planning process for the 2000 plan started in December of 1996 following establishment of the Sturgeon Management Assessment Team (SMAT). The SMAT consisted of a diverse group of individuals representing the Wisconsin Department of Natural Resources (WDNR), U.S. Fish and Wildlife Service, the Great Lakes Indian Fish and Wildlife Commission (GLIFWC), the Menominee Tribe, the University System, the aquaculture industry, several private sporting organizations, the sport fishing industry, and the angling public. During the planning process, the SMAT identified nine issues they viewed as critical to future Lake Sturgeon management in Wisconsin. These issues included lack of biological information, loss of habitat, protection from legal and illegal harvest, best genetic practices, and developing a robust public engagement process.

Over the last 17 years there has been great advances in the management of Lake Sturgeon in Wisconsin under the guidance of the 2000 Lake Sturgeon Management Plan. Thus, many of the objectives and recommendations outlined in the 2000 management plan have been adequately addressed and are no longer relevant. Simultaneously there are emerging issues related to Lake Sturgeon management that were not included in the current plan. Therefore, the DNR Sturgeon Management Team, consisting of WDNR, GLIFWC, and Wisconsin Conservation Congress representatives, has begun a process to update the Sturgeon Plan.

This document is a review of the work completed under the guidance of the 2000 Lake Sturgeon Management Plan. The document is intended to serve as a reference document to evaluate which management recommendations from the old plan are still prudent and need to be included in the updated plan.

# Objectives and Management Recommendations

The Lake Sturgeon Management Plan has a hierarchical structure; management level objectives (X.0) are identified, with several individual objectives listed under those management level objectives. In this review, we have mainly reproduced these objectives and associated recommendations (high, medium, or low priority, where applicable) to address each group of objectives. We have inserted brief comments summarizing work accomplished toward each of the specific recommendations. Look for italicized text preceded by the phrase, “*Review Comments*” throughout this document.

More information and specifics about some of the recommendations will be referenced and included as appendices.

## 1.0 Sturgeon Population and Life History Information Needs

### Objectives:

- 1.1 Maintain/enhance current sturgeon population assessments
- 1.2 Develop and implement standardized population assessments on all existing populations
- 1.3 Conduct life history research/assessments where needed

### High Priority Recommendations:

- a) Develop as standardized collection techniques as possible to conduct population studies (estimates, age/growth, size structure, etc.)**

#### *Review Comments:*

*Each Fish Team has developed standardized collection techniques to assess the sturgeon populations in their management area. A statewide sampling protocol would not be applicable because sampling techniques are tailored to individual populations due to attributes of that population and waterbody (e.g. population size, surrounding landscape, riparian landowner, etc.). Current statewide Lake Sturgeon monitoring efforts are summarized in Appendix 1.*

- b) Establish a priority list of waters that need assessment work**

#### *Review Comments:*

*Each Fish Team prioritizes waters in their management area to assess. See Appendix 1 for a list of priority waters.*

- c) Assess success of reintroductions by methods identified in Objective 1.2**

#### *Review Comments:*

*Lake Sturgeon reintroductions have occurred in nine waterbodies in recent years and the reintroductions have been assessed in most waters. Common assessment techniques involve tagging (PIT, acoustic, radio,*

etc.) or marking of fish prior to stocking and subsequent recapture of stocked fish. Overall, there has been tremendous success in the reintroduction of these formerly extirpated populations, but work is still ongoing. See the list below for specific details for each reintroduced population:

- *Wolf River at Keshena Falls – acoustic telemetry and PIT tag recaptures to monitor movement of transferred sub adult and adult Lake Sturgeon; drift nets used to capture larval Lake Sturgeon below Keshena Falls in 2013*
- *Upper Fox River – recapture of PIT tagged stocked fingerlings; first gravid male captured in Princeton during 2017 spawning stock assessments*
- *Upper Menominee River – acoustic telemetry and PIT tag recaptures of stocked fish; spawning fish observed below Sturgeon Falls in 2009*
- *Baraboo River – dam removal in 2001 (Catalano et al. 2007); reintroductions began in 2010; all fish stocked from 2012-present have been PIT tagged; no evaluation of stocked fish*
- *Milwaukee River – radio (2006) and acoustic (2006-2008) telemetry of stocked fish; recapture of stocked fish during annual juvenile gillnet assessments within Milwaukee Harbor since 2013*
- *Kewaunee River – acoustic (2009-2010) telemetry of stocked fish; juvenile gillnet assessment within Kewaunee Harbor, no fish captured to date*
- *St. Louis River – recapture of Wolf River genetic strain fish stocked in the 1980s; natural reproduction documented through larval drift net sampling by Fond du Lac Band of Lake Superior Chippewa in 2010 and 2017*
- *Upper Wisconsin – fall gillnetting assessment and recapture of stocked fish (2006-2016); recapture of stocked fish during intermittent fall gillnetting in Biron and Kilbourn Flowages; recapture of stocked fish during spring electrofishing at Nekoosa and Dubay Dam tailwaters*
- *Upper Namekagon River – stocking has occurred, but success has not been evaluated*
- *Manitowish River – sub adults and adults captured in gillnet assessments within the Turtle-Flambeau Flowage demonstrate survival and growth of natural and stocked cohorts; age based on pectoral fin bone cross-sections*
- *Couderay River – Grihm Hydroelectric Project removed in 2011; Lake Sturgeon captured with gill nets and angling during recent surveys*
- *East Fork Chippewa River – PIT tag recapture and detection by swim-over antennas/recorders show movement through nature-like fishway installed in 2011*

#### Medium Priority Recommendations:

- d) Identify characteristics that correlate with successful reproduction and recruitment (e.g., fungus mortality of eggs, predation on various life stages, assessment of spawning grounds)**

*Review Comments:*

*There have been many management activities and research projects that have advanced the understanding of Lake Sturgeon recruitment within Wisconsin Lake Sturgeon populations including:*

- *Winnebago System - >90% entrainment survival of fingerling and yearling Lake Sturgeon through hydroelectric dams (Normandeau 2015); >99% survival of sub adult and adult Lake Sturgeon through spillway gates; recruitment index has been pursued but not established due to low juvenile catch rates (Snobl et al. 2017)*
- *Green Bay Tributaries – Purdue University graduate students have evaluated reproduction/recruitment on the Peshtigo River, particularly predation and survival of early life stages (Benson et al. 2006; Daugherty et al. 2008; Caroffino et al. 2009; Caroffino et al. 2010A; Caroffino et al. 2010B)*
- *Lower Chippewa River – juvenile sturgeon index is being developed based on a hook and line survey; larval sturgeon observed after minimum flows were established below the minimum flow unit at Jim Falls*
- *Wisconsin River – successful natural reproduction likely occurring in Kilbourn Dam tailrace due to suitable substrate and river conditions; Lake Wisconsin Lake Sturgeon population is and always has been self-sustaining; potential natural reproduction below Prairie du Sac Dam, however, undocumented as no larval sturgeon were collected during drift net sampling in spring of 2011 and 2012.*
- *St. Louis River – natural reproduction documented in 2010 and 2017 drift net surveys by Fond du Lac Band of Lake Superior Chippewa; gill net surveys conducted by Minnesota DNR (MDNR) to assess juvenile Lake Sturgeon population; currently a joint project between MDNR, WDNR, Fond du Lac Band, and UWSP to assess movement of adult fish in Lake Superior and the St. Louis River*
- *Mississippi River– incidental catch of juvenile Lake Sturgeon during non-sturgeon assessments; recovering population*
- *Manitowish, Flambeau, and St. Croix Rivers – IFIM (Instream Flow Incremental Methodology; Bovee 1982) studies revealed that adequate discharge is needed to maintain suitable habitat downstream of peaking hydroelectric projects and storage reservoirs that manipulate the natural river hydrograph*

**e) Identify seasonal migration patterns**

*Review Comments:*

*Since 2000, there has been a tremendous amount of work done throughout Wisconsin to address this recommendation. Lake Sturgeon are marked with PIT tags and/or Floy tags during most standard assessments, and mark-recapture data has shed light on course movement patterns for many populations. Acoustic and radio telemetry has also been used in some situations to provide more extensive information on fish movement. Much of this research is still ongoing as acoustic and mark-recapture data are still being collected. The following management activities and research projects have advanced the*

*understanding of Lake Sturgeon movement and seasonal habitat use within Wisconsin Lake Sturgeon populations:*

- *Winnebago System - 1-10 year acoustic transmitters implanted in >300 adult Lake Sturgeon to monitor migration patterns and spawning periodicity (many tags still active); radio and acoustic telemetry of stocked and wild juvenile and sub adult Lake Sturgeon within Wolf River and Upriver Lakes (Snobl et al. 2015; Snobl et al. 2017); mark/recapture PIT and Monel tag data dating back to 1950s*
- *Green Bay Tributaries - acoustic telemetry and genotype assignments of adults on the Menominee, Peshtigo, Oconto and Fox Rivers*
- *Upper Menominee River – mark/recapture PIT and floy tag data dating back to 1969*
- *Bad River – mark/recapture PIT and Floy tag data; acoustic telemetry to monitor movement Lake Sturgeon within Lake Superior basin*
- *Montreal River – mark/recapture PIT and Floy tag data*
- *White River - mark/recapture PIT and Floy tag data*
- *Upper Wisconsin (Stevens Point and Petenwell Flowages) – mark/recapture PIT tag data; radio telemetry of 2-3 year old fish in 2007*
- *Lower Wisconsin - 5-year radio transmitters implanted in 16 adult Lake Sturgeon below Prairie du Sac Dam in October 2007, fish tracked through end of 2012*
- *Chippewa River – mark/recapture PIT, Floy, and Monel tag data*
- *East Fork Chippewa River – radio telemetry to track daily and seasonal movements of adult sturgeon from 2001-2003*
- *North Fork Flambeau River - radio telemetry to track daily and seasonal movements of adult sturgeon from 1990 - 1992*
- *St. Croix – mark/recapture PIT tag data*
- *Mississippi River- radio telemetry to track movement of Lake Sturgeon in Mississippi River (Pool 10) and lower Wisconsin River in 2007*

#### **f) Identify natural sex ratios**

*Review Comments:*

*In general, sex data is recorded (when available) during assessment surveys. Therefore, most sex ratio information is based off spawning stock surveys, which is biased due to maturation and spawning periodicity. The Winnebago System harvest provides the most unbiased data. Data indicate that sex ratio is close to 50/50 within wild populations (Winnebago System data), while sex ratios during spawning assessments is skewed towards males.*

### **g) Assess homing and imprinting behavior**

#### *Review Comments:*

Numerous studies have been conducted to assess the homing and imprinting behavior of Lake Sturgeon in Wisconsin. The most in-depth work has occurred on the Winnebago System and on the Green Bay tributaries. Fish released as part of streamside rearing programs on the Kewaunee and Milwaukee Rivers have not yet reached maturity to evaluate this objective. As populations continue to grow, this priority will be addressed to a higher degree. Below is a list of projects that have assessed or are currently assessing the homing and imprinting behavior of Lake Sturgeon:

- Winnebago System – mark/recapture PIT and Monel tag data to evaluate spawning site and river fidelity (not 100%); acoustic telemetry data to evaluate spawning site and river fidelity; stocked fish in upper Fox River starting to mature and will be captured during spring spawning assessments (1 fish captured in 2017)
- Green Bay Tributaries – genetic and acoustic telemetry data to evaluate spawning site and river fidelity for Menominee, Peshtigo, Oconto and Fox Rivers
- Milwaukee River – mark/recapture PIT tag data collected during juvenile gillnet survey; future capture of adult lake sturgeon during spring spawning assessments to assess homing behavior
- Kewaunee River - mark/recapture PIT tag data collected during juvenile gillnet survey; future capture of adult lake sturgeon during spring spawning assessments to assess homing behavior
- St. Louis River - acoustic telemetry study in progress to evaluate spawning site and river fidelity

### **h) Identify other research needs as appropriate**

#### *Review Comments:*

There have been many Lake Sturgeon centric research projects that have been completed during the implementation of the 2000 Lake Sturgeon Management Plan. Some of those projects are identified throughout this document. There are many research needs throughout the state that are anticipated to be addressed with future research projects including:

- Statewide - develop protocols for estimating age and growth of Lake Sturgeon; graduate research project currently underway to evaluate different methodologies (otoliths, pectoral fin rays, corrected pectoral fin rays, mark/recapture growth models) for estimating age and growth of Lake Sturgeon in the Winnebago System population
- Winnebago System – explore feasibility of recruitment index through larval sampling and other gears
- Upper Wisconsin River and Turtle-Flambeau Flowage - diet studies to evaluate bioenergetics and assess need for future stocking
- Lower Wisconsin River - assess natural reproduction below Prairie du Sac Dam; begin juvenile assessment in Lake Wisconsin and below Prairie du Sac Dam



- *Baraboo River - evaluate stocking success and habitat use of stocked juvenile sturgeon; assess re-colonization of adults from the Lake Wisconsin*
- *St. Croix River – identify spawning locations*
- *Lower Chippewa River - evaluate movement between large river systems*
- *Mississippi River – assess Lake Sturgeon populations in lower pools*
- *Menominee River – evaluate movement and retention of adult sturgeon passed above the Menominee and Park Mill dams*
- *Menominee River – evaluate recruitment associated with sturgeon passed above the Menominee and Park Mill dams*

### Low Priority Recommendations:

#### **i) Search for remnant populations**

##### *Review Comments:*

*Prior to the 2000 management plan there was little biological data available for many Lake Sturgeon populations within Wisconsin. Rehabilitation efforts over the last 17+ years has paid dividends with some of these populations. In our review, we identified two different types of remnant populations: 1) populations where little information was available and spawning stocks were significantly suppressed at the time of the plan and 2) populations where very few fish currently exist.*

*Remnant populations where little information was available and spawning stocks were significantly suppressed include:*

- *Lower Fox River – adult sturgeon captured below the DePere dam via spring electrofishing surveys; spawning observed and larval production documented below DePere Dam*
- *Oconto River – adult sturgeon captured below Stiles Dam during spring electrofishing surveys; larval production documented below Stiles Dam via drift net surveys; fingerling lake sturgeon captured between Stiles Dam and City of Oconto during spotlight surveys*
- *Peshtigo River - adult sturgeon captured below Peshtigo Dam during spring electrofishing surveys; larval production documented below Peshtigo Dam via drift net surveys; fingerling lake sturgeon captured between Peshtigo Dam and Peshtigo Harbor during spotlight surveys*

*Remnant populations where very few fish currently exist include:*

- *South Fork Flambeau River – capture of two very large adults in the Pike Lake Chain of Lakes during fyke net assessments in 2005 revealed a lingering sturgeon population upstream of the Round Lake Dam in 2005.*
- *Madison area lakes – incidental catch of adult sturgeon during fisheries assessments indicate a small remnant Lake Sturgeon population exists in lakes Mendota and Monona; genetic testing suggested these fish most closely resemble populations from the Mississippi River drainage and thus may be remnants of a historic Rock/Yahara sturgeon population; further study of historic*

*stocking records needed to determine the origin of the fish stocked in the 1930s and whether those fish could be the origin of the adults present today*

- *Big Cedar lake – angler catch report in 2017 indicates remnant population exists from previous stocking events*

## **2.0 Habitat Protection and Enhancement**

### **Objectives:**

- 2.1 Identify critical habitats and habitat requirements for various life stages
- 2.2 Identify barriers and other factors within systems negatively affecting sturgeon populations
- 2.3 Enhance habitat where possible

### **High Priority Recommendations:**

#### **a) Identify critical seasonal habitats and improvement opportunities**

*Review Comments:*

*Critical seasonal habitats have been identified for multiple Lake Sturgeon populations in Wisconsin. Visual observation of fish, particularly spawning, is the most straight forward method for identifying habitat use. However, radio and acoustic telemetry have also been used to evaluate habitat use and movement (see recommendation 1.e). Active telemetry techniques can be expensive, thus limited application across all populations in Wisconsin. Some examples of projects identifying critical habitat include:*

- *Winnebago System - acoustic (for adults) and radio (for juveniles) telemetry (Snobl et al. 2015; Snobl et al. 2017) to evaluate movement and habitat use of wild and stocked fish; acoustic telemetry to evaluate downstream movement and spawning locations of Lake Sturgeon transferred upstream on the Wolf River*
- *St. Louis River - acoustic (for adults) telemetry identified sturgeon spawning habitat in tailwaters of Fond du Lac Dam (first dam upstream from Lake Superior)*
- *Manitowish watershed - Instream Flow Incremental Methodology (IFIM) study and visual observations have aided in identification of critical spawning and nursery habitat*
- *Green Bay Tributaries – spot lighting and snorkeling used to evaluate habitat use of juvenile Lake Sturgeon in the Fox, Oconto, Peshtigo and Lower Menominee Rivers*

- *Lower Wisconsin River - visually identified spawning habitat in Kilbourn Dam tailwaters, juvenile habitat downstream of the Dells area, and potential spawning habitat in the Prairie du Sac Dam tailwaters*

**b) Ensure the impacts of dams and habitat needs of species are considered during the FERC relicensing process**

*Review Comments:*

*Fisheries staff worked with WDNR FERC coordinator(s) to ensure the impacts of dams and habitat of sturgeon are considered during the FERC relicensing process. This included discussing strategies (adjusting trash rack spacing, regulating flows, etc.) to reduce entrainment, impingement, and stranding. Additionally, flow regulation and maintenance strategies, particularly during spring spawning and larval development periods, were incorporated into many licenses to reduce the impacts of dams on Lake Sturgeon Populations. Recommendations c) d), and f) below provide more specific examples.*

**c) Work with dam owners to effectively manage or improve habitat in fragmented river systems. Consider dam removal, if warranted, to reconnect fragmented populations. Educate public on the impacts of dams and benefits of dam removal**

*Review Comments:*

*DNR staff have worked with dam owners to manage and improve habitat in fragmented river systems, as follows: removal of Milwaukee River dams at Chair Factory and Lime Kiln; remove Grimh Dam on the Couderay River; removed Baraboo River dams; breached North Avenue Dam on the Milwaukee River.*

**d) Use proper flow management at dams to benefit species (including development of appropriate HSI curves for various life stages)**

*Review Comments:*

*Impacts of varying flow management strategies at hydropower facilities has been well studied in the past. Peaking operations can have detrimental impact on Lake Sturgeon recruitment as discharges are inconsistent and fish spawning in tailraces can experience substantial water level fluctuations. Run of river is best flow management strategy and this strategy is now required in many FERC licenses. Some examples of research into flow management strategies and implementation of those strategies include:*

- *Minimize impacts (drawdown and re-fill rates, minimum depth, timing of drawdown, and minimum downstream flows during re-fill) of reservoir drawdowns at several hydroelectric dams throughout Wisconsin*
- *Minimum flow requirements required in FERC licenses at St. Louis River, Lower Chippewa River and Menominee River (Grand Rapids Dam) to enhance spawning, egg development and larval drift*

- *Green Bay Tributaries - habitat Suitability Index curves (representing depth, velocity, substrate, and cover preferences) developed for the Green Bay tributaries including the Fox, Oconto, Peshtigo and Menominee Rivers (Dougherty et al. 2009)*
- *Peshtigo River – provide adequate flows in tailwater below Peshtigo Dam to enhance spawning and recruitment*
- *Lower Fox River - adjustments to head boards and turbine flows to provide adequate spawning flows for spawning*
- *Lower Flambeau River - stabilized discharge to restore suitability of instream habitat below Flambeau Dam*
- *East Fork of Chippewa River – restored discharge and aquatic habitat in 0.7 mile long river reach below Winter Hydro Project*

**e) Use washed rock riprap (>6”) as material to create new or supplement existing spawning habitat**

*Review Comments:*

*Riprap has been used to create new spawning sites for Lake Sturgeon on Winnebago System tributaries. Additionally, riprap has been used to restore or supplement lake sturgeon spawning habitat at existing spawning sites on Winnebago System tributaries. Riprap projects and large in stream rock structures have not been widely pursued by DNR staff outside of the Winnebago System, in part due to cost. However, private landowners have obtained permits to place riprap for erosion control. Use of large riprap is encouraged in these projects. Examples of creating or supplementing spawning habitat include:*

- *St. Louis River – MN DNR installed large (>24”) boulders below Fond du Lac Dam in 2009; structures designed to withstand excessive river flows and are still in place following historic 2012 flood*
- *Peshtigo and Oconto Rivers - large riprap placed for construction of the U.S. Highway 41 bypass and riprap projects have increased sturgeon spawning habitat*
- *Winnebago System – more than 50 known spawning sites that Lake Sturgeon utilize occasionally to annually, many of which are large riprap placed for erosion control*
- *Peshtigo River – riprap placed on 600 feet of the Peshtigo River*
- *Baraboo River – large riprap placed at Haskins Park as part of boat landing and canoe/kayak launching site;*
- *Lower Wisconsin River – concern that large riprap may not be effective due to high sediment load and shifting substrates*

#### **f) Provide passage at dams where feasible and where passage would benefit sturgeon populations**

##### *Review Comments:*

*Fish passage involves the movement of fish upstream of a barrier. Multiple strategies can be utilized to accomplish this goal including construction of natural bypass channels or elevators. Fish can also be captured from a source population and transferred upstream. Examples of fish passage projects that the Sturgeon Team is aware of in Wisconsin include:*

- *Milwaukee River – natural bypass channel constructed to provide passage at Thiensville-Mequon Dam*
- *East Fork of Chippewa River – natural bypass channel constructed to provide passage at Winter Dam*
- *Upper Fox River – natural bypass channel constructed to provide passage at Montello Dam*
- *Menominee River – elevator constructed to capture fish and provide passage at Menominee and Park Mill Dams*
- *Wolf River – capture and transfer of Lake Sturgeon to provide passage around Shawano Paper Mill and Balsam Row Dams*

*Other FERC licenses have mandated fish passage articles that have not yet been implemented (e.g. Balsam Row on the Wolf River, Prairie du Sac on the Wisconsin River, White Rapids and Chalk Hills on the Menominee River). There are other non-licensed dams where stakeholder groups have requested fish passage (e.g. Round Lake Dam on the South Fork of the Flambeau River).*

#### **g) Discourage riparian uses that negatively affect populations**

##### *Review Comments:*

*Fisheries staff discuss erosion control permits with WDNR Stormwater and Water Regulation and Zoning staff to reduce negative impacts on sturgeon rivers.*

##### **Medium Priority Recommendations:**

#### **h) Encourage riparian uses that benefit populations**

##### *Review Comments:*

*When Riparian land owners modify shorelines in sturgeon rivers, they consider including a permit requirement that the permittee install, where appropriate, large riprap for the benefit of sturgeon populations. Fisheries biologists review most Chapter 30 applications prior to permitting.*

*Many FERC licenses for hydropower projects in northwest Wisconsin require licensees to develop and implement Shoreland Buffer Plans and Erosion Control Plans to protect water quality and preserve the natural character of undeveloped shorelines.*

#### **i) Evaluate habitat improvement projects**

*Review Comments:*

*As stated earlier, most of the habitat improvement projects pursued for Lake Sturgeon have been spawning habitat projects(riprap) on Winnebago System tributaries. These projects have been evaluated through the visual observation of spawning fish following rock placement. However, not all projects have yielded successful results, at least up to the time this document was published. For example, acoustic telemetry data suggest that adult sturgeon do not stage on recently placed riprap along 600 shoreline feet of the lower Peshtigo River.*

#### **j) Complete Wolf River sturgeon spawning substrate and flow study report**

*Review Comments:*

*A formal substrate and flow report was not conducted. However, through 40+ years of observation, fisheries staff have identified criteria for rock size and flow requirements for Lake Sturgeon spawning on the Wolf River.*

#### **Low Priority Recommendations:**

#### **k) Determine water quality needs for populations**

*Review Comments:*

*Water quality needs have not been determined for sturgeon populations. Attainment of state water quality standards should adequately protect Lake Sturgeon as part of the warmwater/coolwater fish community in Wisconsin lakes and rivers.*

### **3.0 Genetics and Propagation, Transfers, and Reintroduction**

#### **Objectives:**

- 3.1 Define existing strains/populations and role of genetics in management and rehabilitation or reintroduction
- 3.2 Ensure statewide commitment and coordination of sturgeon propagation programs
- 3.3 Maximize genetic variability in hatchery reared fish used for rehabilitation or reintroduction
- 3.4 Establish best technical criteria and protocol for maximum quality assurance in propagation efforts

#### **High Priority Recommendations:**

**a) All stocking and reintroduction proposals be reviewed by Sturgeon Management Assessment Team**

*Review Comments:*

*Some of the earlier stocking and reintroduction proposals may have been reviewed by the Sturgeon Management Assessment Team. However, as described in objective 7.0, the Sturgeon Management Assessment Team has not met since 2006. New fish stocking rules and regulations were implemented in 2008, and as a result production has shifted away from fry stocking. The majority of the fish released are now large fingerlings (8"+) or yearlings (13"+). Survival of fish stocked as large fingerling vs yearling is still being assessed, but preliminary data suggest higher survival of yearling sized fish. Since 1998, there have been Lake Sturgeon stocked in 41 waterbodies spanning 27 counties. Twenty-nine of those waterbodies have been stocked at least once with either small fingerlings, large fingerlings, yearlings, or adults since 2008.*

**b) Use similar strains within basin for stocking and transfers, unless extirpated in the basin**

*Review Comments:*

*Five source populations of Lake Sturgeon are currently recognized for propagation in Wisconsin waters: Yellow River, Flambeau River, Menominee River, Wisconsin River and Wolf River. Progeny from each source population are now only to be stocked in waters of the same drainage.*

**c) Form a committee to establish genetic hatchery guidelines, standards, and technical criteria for the propagation of Lake Sturgeon. (follow existing guidelines until own guidelines can be developed)**

*Review Comments:*

*A committee was never formed in Wisconsin to establish genetic hatchery guidelines, standards, and criteria for propagation. However, the Great Lakes Fishery Commission sponsored a document identifying genetic guidelines for stocking Lake Sturgeon in the Great Lakes (Welsh et al. 2010). Current practices in WDNR hatcheries promote genetic diversity through standard propagation techniques. Each female is paired with multiple males (2-8 based on availability). The progeny from each pairing is then kept separate for as long as possible, based on hatchery logistics, to ensure an equal representation from each is present in the lot of fish to be stocked out.*

**d) Acclimate fish to water body prior to release**

*Review Comments:*

*Traditional propagation practices are to match the water temperature on the distribution truck as close as possible to the conditions of the receiving waters. If the hatchery has the ability, it will manipulate the rearing water temperature to more closely match the receiving water. If that ability is not possible, the distribution truck will try to haul the fish at the mid-point temperature between the hatchery and receiving waters. Stream side rearing facilities are currently used to rear fish on the Milwaukee and Kewaunee Rivers. In this format, fish are reared with river water and thus acclimated to the source river.*

**e) Annually stock at the suggested minimum densities for rehabilitation purposes for a recommended duration of 25 years of:**

<u>Fry</u>	<u>Fingerlings</u>	<u>Yearlings</u>
Based on availability and objectives	River 80 per mile Lakes 1 per 2 acres	40 per mile 1 per 4 acres

These recommended rates were based upon estimated population densities of the Menominee River (for the river rates) and Lake Winnebago (for the lake rates). The historical estimated population densities in both waters were used as starting points from which the number of fingerlings and/or yearlings needed on an annual basis to affect a complete recovery of the stock, were estimated. The true effectiveness of the implementation of these rates has not been tested and will need to be evaluated as Lake Sturgeon rehabilitation projects proceed. For rehabilitation of extirpated or severely depressed stocks, it is recommended that annual stocking occur for at least 25 years or one generation of a Lake Sturgeon population. Well-designed stocking evaluations conducted during that time period will provide the data necessary to adjust the stocking rates as needed to result in the ultimate densities desired for the target water.

*Review Comments:*

*Fry stocking was abandoned in 2008, and there has not been a thorough evaluation of preferred stocking densities completed for fingerling or yearling Lake Sturgeon. For the most part, stocking densities have been lower than targets identified in the 2000 Lake Sturgeon Management Plan and annual stocking for a minimum of 25 years has not occurred. Rather, stocking quotas have been based on discretion of the local fisheries manager and hatchery capacity and budget. Survival of fall fingerling vs yearling sized lake sturgeon has not been comprehensively evaluated. However, both life stages have been stocked in the Menominee River and preliminary results indicate better survival of yearling sized fish.*

**Priority List of Wisconsin Lake Sturgeon Rehabilitation Waters - The Sturgeon Management Assessment Team categorized the following waters as priorities in the Lake Sturgeon rehabilitation process:**

*Review Comments:*

*Many of the populations identified for restoration in the 2000 Lake Sturgeon Management Plan have benefitted from stocking events. Below is a quick update on the stocking conducted for each water. Stocking has ceased for some of these populations as fisheries managers assess population status and evaluate need for further restoration. A complete list of Wisconsin waters stocked with Lake Sturgeon since 2000 is available in Appendix 2.*

**A. Waters with ongoing restoration efforts:**

- The Wisconsin River from Stevens Point to Lake Du Bay – intermittent stocking of fingerling and yearling fish from 2002-2015; stocking has ceased and stocking strategies and needs are being evaluated



- **The Menominee River below Sturgeon Falls** - *intensive stocking of fingerlings and yearlings between 2000-2017; no stocking planned for at least the next few years while stocking practices are evaluated; adults transferred from White Rapids to Sturgeon Falls in 2003, 2011 and 2012*
- **The Upper Flambeau River - Manitowish River system** – *stocked six years between 1994-2015; stocking suspended upstream of Turtle-Flambeau Dam pending estimate of population density and evaluation of diet*
- **The St. Louis River** – *intensive stocking between 1982-2000; MDNR stocking ceased in 2002; stocking ceased due to difficulty obtaining eggs from a Lake Superior source population; natural reproduction is now occurring; Fond du Lac Band stocked fingerlings in the Upper St. Louis River during 1998-2006 and temporarily ceased stocking in 2007 due to VHS concerns; stocking has resumed on an annual basis since 2013*
- **The Bad River** - *stocking of various life stages occurred in 1988 and 2001; stocking ceased because the population was determined to be self-sustaining in the early 2000s.*
- **Menominee Reservation Waters - Middle Wolf River System, Legend Lake** –*subadult and adult Lake Sturgeon captured from the lower Wolf River and transferred upstream of the Balsam Row Dam annually since 2011 with additional transfers dating back to 1995; 985 fall fingerling and yearling Lake Sturgeon stocked above the Balsam Row Dam; USFWS has stocked juvenile sturgeon in the Legend Lake complex*
- **St. Croix/Namekagon River System** - *multiple Lake Sturgeon stocking events in the Namekagon River between 2003-2015; Lake Sturgeon also stocked in the St. Croix River multiple years between 2002-2015*

#### **B. Waters in which rehabilitation can begin:**

- **The Upper Fox River from Princeton to Lake Butte des Morts** - *stocking commenced in 2002 and currently ongoing; various life stages ranging from larvae to 4-year old juvenile sturgeon have been stocked, currently 500 fall fingerlings per year stocked*
- **Green Bay and its tributaries** - *no stocking of the Wisconsin tributaries to Green Bay has occurred besides the Upper Menominee; MI DNR operates streamside stations on the Cedar and Whitefish rivers in northern Green Bay, fertilized eggs originate from the Menominee or Peshtigo River*

#### **C. Other potential rehabilitation waters (will need more information, plan development, etc. before rehabilitation efforts can begin):**

- **Lake Michigan and its tributaries** – *stocking from streamside rearing facilities on the Milwaukee and Kewaunee Rivers since 2006 and 2009, respectively; facilities use source water for raising the fish to maximize the likelihood of imprinting fish to their respective rivers, technique needed to ensure the viability of remnant stocks in the Great Lakes; Manitowoc River (2003, 2005-2007) and Branch River (2005-2007) also stocked*

- *Lac du Flambeau Reservation waters – fingerling stocking stopped in Flambeau Chain in 2010 as grant funding ceased.*
- *Red Cedar River - no stocking since 1982; multiple year classes of spawning adults captured in recent years*
- *Mississippi River - no stocking in Mississippi River proper has occurred, but fish have been stocked in multiple tributaries; adult Lake Sturgeon have been captured incidentally in surveys on the Mississippi River, but more assessment work needed to evaluate the success of rehabilitation efforts*

*Additional category of waters added as part of this review:*

*D. Waters not identified in the 2000 Lake Sturgeon Management Plan where restoration efforts have begun or are being currently pursued:*

- *Baraboo River – stocking Wisconsin River Strain since 2010; current quota of 500 yearlings stocked annually*
- *Black River - currently being pursued but no action yet*
- *Couderay River - Lake Sturgeon observed and captured on the Couderay River following removal of Grimh Dam in 2011*
- *Menominee River - Transfer of Green Bay adults above Menominee and Park Mill Dams in 2015 (ongoing)*

## **4.0 Harvest and Fisheries Information Needs**

### **Objectives:**

4.1 Develop and implement standardized exploitation assessments

### **High Priority Recommendations:**

**a) Develop standardized catch/harvest assessment techniques that include a measure of exploitation, effort, and age, size, and sex of fish (registrations, rotational creel surveys)**

#### *Review Comments:*

*Standardized catch/harvest assessment techniques have been implemented in applicable Lake Sturgeon fisheries throughout the state (i.e., hook and line since 1983, Winnebago system spearing since 1955, and tribal spearing). Sturgeon harvest tags and mandatory registration provides estimates of harvest, exploitation, and angler effort as well as Lake Sturgeon population information such as age, size, sex and stage of maturity.*

*Catch and release hook and line angling for Lake Sturgeon in Wisconsin waters does not require a harvest tag or additional reporting outside of creel survey participation.*

**b) Determine incidental catch and harvest of sturgeon in commercial fishing operations (identify areas open to commercial fishing contracts that may be closed in future)**

*Review Comments:*

*There are no commercial fisheries for Lake Sturgeon in the state of Wisconsin waters or Wisconsin border waters. Incidental catch of Lake Sturgeon can occur in commercial fishing gear (i.e., gill nets, trap nets and trawls). Observation of commercial fishing bycatch suggests that Lake Sturgeon is not a species that is commonly captured or killed in commercial gears (Peeters 2001; Zollweg et al. 2003). There have been Lake Sturgeon mortalities from the commercial gears on the Mississippi River and a reporting and permit program was recently implemented to allow commercial fishermen to legally dispose of bycatch mortalities.*

*Great Lakes commercial fishers, state managers and tribal members have worked cooperatively to reduce incidental catch of Lake Sturgeon and other non-target species and support rehabilitation of fish stocks (Lake Superior Fishing Agreement 2005-2015, Lake Michigan Integrated Fisheries Management Plan 2015-2024). Efforts to reduce incidental catch mortality on Lake Superior include establishment of fisheries refuges (Lake Superior Fishing Agreement 2005-2015). Lake Michigan commercial fisheries have eliminated the use of certain gillnet mesh sizes and imposed restrictions on depth and season of use (Lake Michigan Integrated Fisheries Management Plan 2015-2024).*

*Commercial fishing for rough fish (Lake Butte des Morts, Winnebago system) utilizing seines have been monitored and no mortality of captured Lake Sturgeon has been observed. Currently there is no concern for Lake Sturgeon incidental catch mortality as a part of these commercial fisheries.*

**c) Continue Winnebago spearing assessment**

*Review Comments:*

*Assessment of the Winnebago and Upriver Lakes spear fishery is ongoing. This fishery is regulated by a harvest cap system that maintains harvest at or below 5% of the population abundance.*

**d) Examine impact of regulations (length limits, season, etc.) on spearing and hook and line fisheries**

*Review Comments:*

*The life history of Lake Sturgeon makes them particularly vulnerable to overexploitation and slow to recover once a population is in decline. Minimum length limits have been used to reduce the harvest of immature sturgeon. However, the use of minimum length limits can focus angling effort to larger fish and bias harvest to mature females. The use of minimum length limits on Lake Sturgeon populations has been most effective when coupled with regulations that change exploitation (e.g., a decrease in bag limit or season length).*

*Concern of high exploitation and increased hook and line fishing pressure yielded a more conservative regulation strategy for the lower Wisconsin River and Menominee River beginning in 2000. For even years, the minimum size limit would be 70 inches while odd years would have a 50-inch minimum size limit. While this regulation change effectively reduced the exploitation rate to 0 in even years, exploitation rates*

of 13% in the White Rapids section and 16% below the Menominee Dam were calculated from the 2005 harvest (Donofrio 2008). Therefore, regulations became more conservative in 2007 (Menominee River and other inland waters) when the minimum size changed from 50 inches to 60 inches. This change reduced the statewide hook and line harvest from 453 fish in 2005 to an average of 34 from 2007-16 (see Figure 1 in Objective 6.0). The length of season was also reduced from 6 weeks to 4; from the first Saturday in September through September 30 (previously the season ended mid-October).

Long term data on Lake Superior suggested that an increase in minimum length limit from 40 inches (101.6 cm) to 50 inches (127 cm) in 1992 helped to increase population abundance. Thus, managers have begun the process of increasing the minimum length limit further to 60 inches (152 cm) from the current 50 inches (127cm) as a result of increases in harvest in recent years. By increasing the minimum length limit, managers hope to limit harvest and provide continued population growth for the Lake Superior Lake Sturgeon populations.

A 50-inch (127cm) minimum length limit on the Prairie du Sac tailwater in 2005 was coupled with an exploitation rate of 26.1%. This exploitation rate was thought to be dangerously high and well over the 5% exploitation sustainable threshold recommended for Lake Sturgeon. Thus, the hook and line harvest regulation of alternating years of 50-inch (127.0 cm) and 70-inch (177.8 cm) minimum length limits was changed to a 60-inch (152.4 cm) minimum every year beginning in 2007. As a result, exploitation of Lake Sturgeon has been much lower and more stable ranging from 0.9% to 10% and averaging 5.4% annually for the period from 2007-2016.

Length limit changes and changes in season length on the Winnebago spear fishery were used to control harvest and maintain exploitation near the 5% guideline for Lake Sturgeon fisheries. These changes resulted in an increase in the density of sturgeon on Winnebago above the length limit, an increase in average length of male sturgeon and a stable average length of female sturgeon from the mid-1970s to the 1990s (Bruch 1999).

### **Medium Priority Recommendations:**

#### **e) Conduct literature review on exploitation of sturgeon fisheries**

##### *Review Comments:*

A literature review of Lake Sturgeon biology and population dynamics including a section on fisheries exploitation was published by WDNR biologists (Bruch et al. 2016). Currently, there is little published literature specifically on Lake Sturgeon exploitation rates.

In the past, Lake Sturgeon were heavily exploited over most of their range. Prior to the mid-1800s sturgeon were perceived as a nuisance fish that damaged fishing gear (Becker 1983). Thus, fisherman tended to destroy captured Lake Sturgeon with little regard for its commercial value (Becker 1983; U.S. Fish and Wildlife Service). By the mid to late-1800s the economic value of Lake Sturgeon for its flesh and roe for caviar was recognized and commercial fisherman began to specifically target them. Over the period from 1879-1900, commercial harvest of Lake Sturgeon in the Great Lakes averaged 4 million pounds annually with a maximum harvest observed in 1885 at 8.6 million pounds (U.S. Fish and Wildlife Service). Throughout the early and mid-1900s commercial fishing for Lake Sturgeon continued but catches were consistently on the decline. In Lake Michigan, commercial fishing for Lake Sturgeon was closed in

1929 after harvest declined to 2,000 pounds from an observed high of 3.8 million pounds in 1879 (U.S. Fish and Wildlife Service). Commercial harvest in other Lake Sturgeon fisheries in the Great Lakes were at very low levels after 1956 (U.S. Fish and Wildlife Service). Lake Sturgeon was first listed as vulnerable in 1986 (IUCN Redlist) and declared threatened by the American Fisheries Society in 1989 (Williams et al. 1989). As a result of listing Lake Sturgeon populations as endangered, threatened or vulnerable throughout their native range by federal entities (IUCN Redlist, U.S. Fish and Wildlife Service) and state agencies commercial and recreational fishing was prohibited throughout much of their native range (Alabama, Georgia, Illinois, Indiana, Iowa, Kentucky, Missouri, New York, Ohio, Pennsylvania and Tennessee; Bruch et al. 2016).

Currently, commercial fishing for Lake Sturgeon in U.S. waters is prohibited. Recreational fisheries for Lake Sturgeon exist in U.S. waters in Michigan, Minnesota, and Wisconsin (Bruch et al. 2016). Tribal fisheries for Lake Sturgeon occur in Michigan and Wisconsin (Bruch et al. 2016). Lake Sturgeon fisheries in the US tend to be heavily regulated and comprehensively monitored to avoid the overexploitation observed in the past (Dumont et al. 1987; Rochard et al. 1990; Bruch 1999; Bruch et al. 2016). An annual exploitation rate of 5% for Lake Sturgeon is approximately equivalent to the estimated recruitment rate of Lake Sturgeon to the harvestable stock (Folz and Meyers 1985; Lake Sturgeon Management Plan WDNR 2000). In Wisconsin Lake Sturgeon fisheries exploitation targets near 5% have been used in population recovery and have resulted in improvements in size structure and abundance on the Prairie du Sac Tailwater, the Winnebago system, and the Menominee River.

#### **f) Determine hooking mortality of sturgeon (identified as medium/low priority)**

##### *Review Comments:*

There has been little to no research on hooking mortality of Lake Sturgeon in North America, but a few studies have been conducted on white sturgeon (*Acipenser transmontanus*) fisheries in the Pacific Northwest, USA and British Columbia, Canada. White sturgeon hooking mortality was found to be relatively low (2.6 – 4.0%; Jager et al. 2002; Robichaud et al. 2006). However, delayed or hooking mortality effects on Lake Sturgeon in Wisconsin are currently unknown. Research on hooking mortality rates for Lake Sturgeon has since been identified as a high priority action item for Wisconsin Lake Sturgeon management. Anecdotal evidence of low hooking mortality for Lake Sturgeon needs to be verified so that estimates of exploitation can be confirmed and the potential impacts of regulations to sturgeon populations can be adequately assessed.

##### Low Priority Recommendations:

#### **g) Determine impact of barriers that concentrate fish and increase harvest**

##### *Review Comments:*

Lake Sturgeon are known to concentrate in small areas outside of the spawning season making them vulnerable to exploitation (McLeod et al. 1999, Lake Sturgeon Management Plan WDNR 2000). Seasonal closures for Lake Sturgeon may not be as effective at controlling harvest as identifying areas of concentration and controlling harvest in these specific locations (McLeod et al. 1999). Identifying areas of Lake Sturgeon concentration in Wisconsin waters and evaluating the impact of hook and line angling on

*these populations has been identified as a high priority research area for the state of Wisconsin Lake Sturgeon fisheries. The potential impact of hooking mortality and the potential for anglers to target a large proportion of the population by fishing these high concentration areas is currently unknown.*

*Concentrations of Lake Sturgeon have been identified in various waters in the state of Wisconsin (e.g., Chippewa River, Flambeau River, lower Wisconsin River, Menominee River). The impact of anglers targeting Lake Sturgeon in these areas has not been thoroughly evaluated. Various efforts have been made by biologists to mitigate the potential impact of hook and line angling targeting Lake Sturgeon in these specific areas including the establishment of refuges on the Chippewa and Flambeau Rivers, and the creation of a catch and release only section of the Menominee River below the Menominee Dam.*

#### **h) List chronology of sturgeon regulations**

*Review Comments: Please see regulations history (1935-2014) in Appendix 3.*

## **5.0 Population Densities**

### **Objectives:**

5.1 Manage Lake Sturgeon populations with biologically and conservationally sound goals

5.2 Reestablish sturgeon throughout their former range

**a) Manage for densities of Age 2+ fish at 250 fish/mile in inland rivers and 1.5 fish/acre in lake systems. (combination in flowages). Populations should be ideally represented by males up to 40 years of age and females up to 70 years of age (no priority assigned; this was the only recommendation in this objective).**

*Review Comments:*

*Little density data exists for Lake Sturgeon in Wisconsin as abundance data is not available for most populations. Further, most of the assessment work conducted on Lake Sturgeon in Wisconsin waters focuses on adult Lake Sturgeon, whereas the recommended density is fish 2 years and older. Thus, it is difficult to evaluate progress for most populations. Most large-scale Lake Sturgeon recovery plans do not contain target densities, but have rather applied recommended densities from Wisconsin's 2000 Lake Sturgeon Management Plan when needed. Based on the best data available, it seems that the target densities of 250 fish/mile and 1.5 fish/acre seem a bit high. The populations where adequate mark/recapture data exists to estimate density include:*

- Winnebago System - current (2017) adult density estimate of 44,000 fish equating to 0.27 adults/acre; density estimate does not include the 49 river miles on the upper Fox River to Princeton or the 115 miles of the Wolf River to Shawano



- *Menominee River - current (2016) adult density estimates for two sections of the Menominee River are 422 fish (16 adults/mile) for the White Rapids section and 198 fish (10 adults/mile) for the Grand Rapids section; abundance estimates for all fish in these sections are 4,082 fish (151 fish per mile) for the White Rapids section and 1,494 fish (75 fish/ mile) for the Grand Rapids section*
- *North Fork Flambeau River - 2014 estimate of 446 adults and sub-adults in the 18-mile segment (24.8 fish/mile) of the North Fork Flambeau River sturgeon bounded by Upper Park Falls Dam and Turtle-Flambeau Dam*
- *Manitowish River and Turtle-Flambeau Flowage - 2014 estimate of 480 adult and sub-adult sturgeon occupied the Turtle-Flambeau Flowage and its headwaters; promising signs of preliminary success in the ongoing efforts to restore a self-sustaining sturgeon population downstream of Rest Lake Dam*
- *Wisconsin River from Prairie du Sac Dam to Kilbourn Dam (including Lake Wisconsin) – 2008 abundance estimate of 1,597 fish  $\geq$  50 inches inhabiting the 9,000 acres between the dams (7,200-acre main impoundment and 1,800 surface acres of river above the lake; 0.18 adults/acre)*
- *Wisconsin River below Prairie du Sac Dam (tailrace only) - annual fall population estimates conducted at the dam tailrace have ranged from 100 to 287 adults  $\geq$  50 inches from 2005-2016*

## **6.0 Regulations and Enforcement**

### **Objectives:**

- 6.1 Manage average annual exploitation of populations at or near 5%
- 6.2 Maintain strong enforcement of sturgeon regulations at all times
- 6.3 Protect remnant and rehabilitating sturgeon populations

### **High Priority Recommendations:**

#### **a) Create separate licensing fee structure for H/L sturgeon fisheries**

##### *Review Comments:*

*Prior to 2006, a hook and line license to fish sturgeon had been included as part of the standard inland fishing license. Thus, anglers needed only to request a free tag (which would validate the harvest of their sturgeon) when they purchased their regular inland license. Post-2006, a separate sturgeon harvest tag is required to be purchased, and all anglers must register their catch at a designated registration station no later than 6 p.m. the day after the fish was captured. Funds from hook and line harvest tags go directly into a dedicated fund to support management of Wisconsin's (non-Winnebago System) Lake Sturgeon populations. No harvest tag is required to catch and release sturgeon in waters open to sturgeon fishing during the open hook-and-line season.*

**b) Designate all monies collected from sturgeon licensing be used for sturgeon management and assessment work**

*Review Comments:*

*Currently, Lake Winnebago sturgeon spearing license fees are deposited to a dedicated account to fund management activities associated with the Winnebago System Lake Sturgeon population. This has included funding riprap spawning habitat projects, purchasing equipment, research projects, and all sturgeon assessments on the Winnebago System. License fees also fund protection efforts (including the Sturgeon Guard program (see section k. below) for law enforcement activities during the annual spear harvest and spring spawning migration. Sturgeon for Tomorrow generously donates funding for groceries during Sturgeon Guard, but it's spearing license dollars that fund non-food expenses and upgrades to the Sturgeon Guard Headquarters.*

*The sturgeon hook and line harvest tag license fees are also dedicated in an account that is to be used for inland sturgeon management in the state.*

**c) Standardize license and carcass tag procedures between spearing and hook and line (Tyvek tag, fee, registration procedure/information collection)**

*Review Comments:*

*In 2016, the Department moved to using paper tags for both spearing and hook and line fisheries for a couple of reasons; the cost of producing Tyvek tags (first used in 2000) and maintaining specialized printers necessary to continue printing Tyvek tags would have been prohibitive for the Department. Further, paper tags allow customers to print their own tags from home computers once they had acquired them online through the Wisconsin DNR licensing GoWild system. The emergency rule implementing use of paper tags in hook and line fisheries to make it consistent with the spearing fishery will go into permanent rule in 2018.*

**d) Evaluate current minimum length limits and expand harvest assessment to make recommendations by 2002**

*Review Comments:*

*The minimum length limits for hook and line harvest were evaluated during the early 2000s, and there was concern of overharvest of this long-lived, vulnerable species. Under the 50" MLL at that time, it was apparent that exploitation rates were too high (Objective 4), thus an emergency rule was instated to curb harvest (Figure 1). In 2000, a yearly alternating 50"/70" minimum length limit was imposed for the Wisconsin and Menominee Rivers (see Figure 1). By 2007, an emergency rule was put in place for an increase in the minimum length limit statewide to be increased from 50" to 60". This rule was permanent as of 2009. Lake Superior was maintained at a 50" minimum.*

*During the years of alternating MLL, hook-and-line harvest on those waters was virtually eliminated in even-numbered years under a 70-inch MLL. However, in those years the 70-inch minimum limits on two selected waters had the unintended consequences of shifting angling pressure to other waters open to H&L sturgeon fishing under the less-restrictive, 50-inch MLL in odd numbered years.*



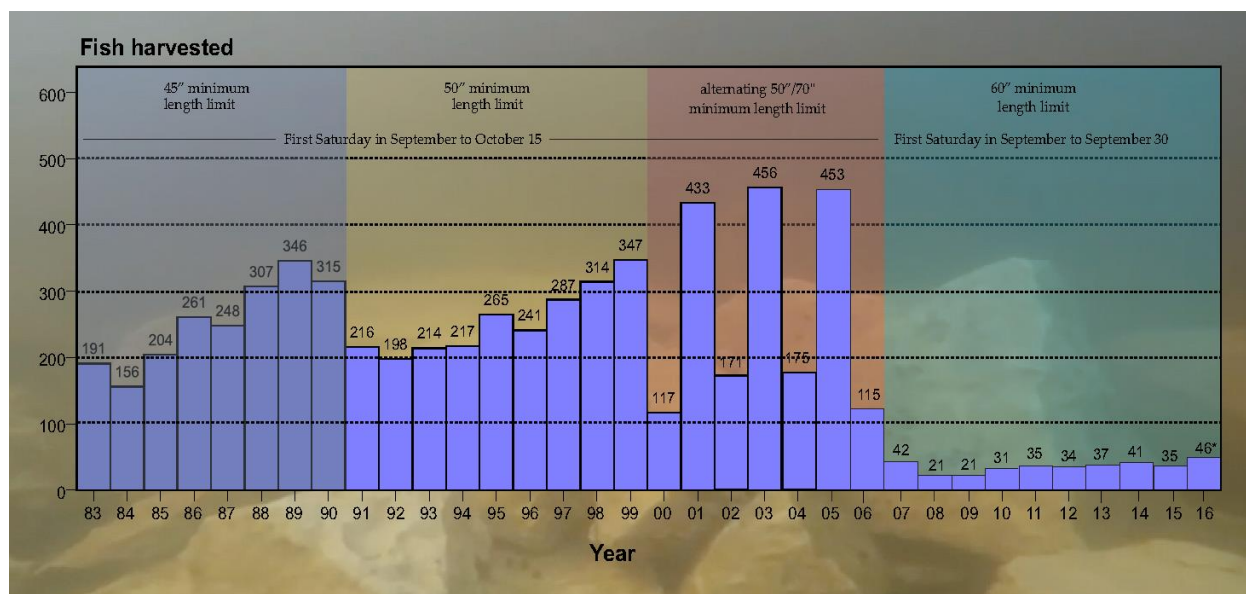


Figure 1. Statewide Lake Sturgeon Harvest, 1983-2016; all hook and line fisheries. Permanent 60" rule adopted in 2009.

On the Winnebago system, the spear fishery for Lake Sturgeon also underwent changes in minimum length limits (see Appendix 3). From a 30" MLL when the spear fishery first opened in 1932, minimum length limits were increased in 1955 (to 40"), 1974 (to 45") then decreased again in 1997 under the Safe Harvest Management System to the current MLL of 36". Several hook and line opportunities were provided during this time as well, but currently there is no hook and line season for Lake Sturgeon on the Winnebago system, and harvest opportunities are restricted to the annual spearing season.

#### e) Remove remnant populations from hook and line harvest opportunity

##### Review Comments:

As more survey data were collected on sturgeon populations around the state, these data were used to identify both remnant and stable populations and helped DNR managers determine where recovery and rehabilitation efforts could be initiated. A review of specific waters that could sustain hook and line fisheries occurred in 2004. Inland fisheries that were not believed to support a stable hook and line fishery were closed.

There is no open season for hook-and-line sturgeon fishing upstream from Turtle-Flambeau Dam while rehabilitation of the remnant sturgeon population and its critical habitat are underway in the headwaters of the Manitowish, Bear, Turtle, and North Fork Flambeau River watersheds.

#### f) Incorporate the hook and line sturgeon tag into the Automated License Issuance System (ALIS)

##### Review Comments:

The hook and line sturgeon tag application was issued through the ALIS system, and this process has now been carried over into the GoWild system.

**g) Implement Oct. 1 license sale deadline for Winnebago spearing license**

*Review Comments:*

*In 2007, the Department modified the spearing license sale deadline for the Winnebago system to October 31st. This date was decided upon with input from staff from DNR Law Enforcement and supported by the Winnebago Citizen Sturgeon Advisory Committee. The October 31<sup>st</sup> deadline was imposed to provide interested spearers another month to purchase their license.*

**h) Examine the possibility of requiring a “harvest” tag or quota system to manage harvest on hook and line fisheries (identified as high/medium priority)**

*Review Comments:*

*A harvest tag requirement was put in place in 1984. The quota system has been discussed on the Sturgeon Management Team, but there are logistical constraints that have not been worked out. Most notably, most populations do not have adequate abundance estimates to allow for a safe harvest level to be confidently established. Further, most river reaches have numerous access points and it would be difficult to maintain the level of communication required between registration stations to manage a quota/cap system effectively. The current 60 inch minimum length limit has decreased harvest and for the time being addressed concerns of overharvest of adult Lake Sturgeon in many inland populations.*

**i) Work with tribal interests to review and compare tribal and nontribal sturgeon harvest (identified as high/medium priority)**

*Review Comments:*

*Sturgeon harvest numbers are shared and reviewed as part of the Inland Fisheries Technical Working Group on an annual basis.*

**Medium Priority Recommendations:**

**j) Develop one statewide sturgeon regulation and information pamphlet (tip card, etc.)**

*Review Comments:*

*While there was no one statewide publication produced, Fisheries staff did develop population specific regulation and information pamphlets that were prepared and sent to appropriate staff for distribution to the local angling public (see Appendix 4).*

*Our current (2017) website (<http://dnr.wi.gov/topic/fishing/sturgeon/SturgeonInlandFishery.html>) details current inland regulations, provides visitors with a map showing hook and line angling opportunities for Lake Sturgeon, downloadable as a .pdf document, as well as a link and .pdf download with instructions on how to correctly tag your sturgeon.*

*We also have a detailed web page for the Lake Winnebago system spearing fishery that provides site visitors with information on the most recent spearing fishery results, a link to the current regulations pamphlet, and several vignettes with information on the spear fishery: (<http://dnr.wi.gov/topic/Fishing/sturgeon/SturgeonLakeWinnebago.html>)*

### **k) Review boundary water regulations and promote regulation consistency**

#### *Review Comments:*

*The DNR continues to work with our boundary waters state partners (MI, MN) to ensure consistency in our sturgeon season and harvest regulations. Most recently, SECTIONS 9, 10, 11, and 12 of Rule CR 15-023 (FH-14-14) applied new regulations on Wisconsin-Minnesota boundary waters that made the regulations consistent between the Wisconsin and Minnesota waters of the Mississippi, St. Croix, Nemadji, and St. Louis rivers, reducing angler confusion and improving ease of enforcement.*

*Additionally, an emergency rule was adopted to extend the catch and release only portion of the Menominee River to the Grand Rapids Dam to ensure that anglers would not be harvesting fish that had been transported from below the lower dams (fish from Green Bay). The Michigan DNR also adopted a rule change in 2016 to match the regulations proposed in the WDNR rule; this rule took effect in Wisconsin on June 1, 2015.*

### **l) Continue Fox/Wolf River “sturgeon patrol” and encourage other patrols on other waters**

#### *Review Comments:*

*The Sturgeon Guard program began in the mid-1970, and initially involved only DNR staff assisting wardens to manage the illegal harvest of sturgeon during their vulnerable spawning period. This program was opened to citizen volunteers in 1988.*

*Currently, each spring, the volunteers of the “Sturgeon Patrol” (300 registered volunteers per year on average) guard spawning Lake Sturgeon 24 hours a day throughout their spawning season at dozens of sites on the Wolf River and other Winnebago System tributaries. Participation in similar “Sturgeon Watch” programs is gaining interest elsewhere across the state.*

*The Menominee Nation has adopted a tribal sturgeon guard program to protect the sturgeon that have been re-introduced to the Wolf River below Keshena Falls, and to bring public awareness to the reestablishment program.*

*Law Enforcement staff guide a loosely-organized group of volunteers to watch for the arrival of the spawning congregation at the confluence of the Thornapple and Chippewa Rivers.*

### **m) Ensure and enhance FH/LE integration on sturgeon issues**

#### *Review Comments:*

*DNR Law Enforcement Staff continue to play a role in sturgeon management and regulation enforcement in Wisconsin. When Management staff were considering shortening the sturgeon hook and line season statewide, Law Enforcement staff were a big part of that decision-making process. Further, Law Enforcement and fisheries staff meet annually to discuss regulations and structure of the sturgeon spear fishery on the Winnebago System. There is regular communication between FH and LE staff during sturgeon spawning seasons across the state.*

## 7.0 Public Input and Involvement

### Objectives:

7.1 Maintain proactive public involvement in sturgeon management

7.2 Develop and implement statewide public education program for sturgeon and sturgeon management

### High Priority Recommendations:

#### **a) Maintain Sturgeon Management Assessment Team to implement and update Sturgeon Management Plan and review ongoing management activities**

##### *Review Comments:*

*The Lake Sturgeon Management Assessment Team was formulated in 1996 with the purpose of reviewing, evaluating and updating sturgeon management goals in Wisconsin. In addition, the team assisted the Department in the creation of the original Lake Sturgeon Management Plan that was completed in 2000. This team consisted of Department staff (Fisheries and Law Enforcement), tribal representatives, USFWS staff and interested stakeholders. The list of the original team is shown below.*

<b>Name</b>	<b>Affiliation</b>
Ron Bruch	WDNR Fisheries and Habitat- Oshkosh
Fred Binkowski	UW-Milwaukee, Great Lakes Research
Gerry Bever	WDNR Fisheries and Habitat - Park Falls
Mark Brann	WDNR Law Enforcement - Eau Claire
Bill Casper	Sturgeon for Tomorrow
Doug Cox	Menominee Tribe
Larry Damman	WDNR Fisheries and Habitat – Spooner
Steve Fajfer	WDNR Fisheries and Habitat - Wild Rose
Tim Gollon	Gollon Bait Company, Dodgeville
Steve Hewett	WDNR Fisheries and Habitat – Madison
Dennis Jones	WDNR Law Enforcement – Oshkosh
Chuck Judd	Judd's Marina, Poynette
Harold Kachur	Wisconsin Wildlife Federation
Joe Kurz	WDNR Fisheries and Habitat - Chippewa Falls
Tim Larson	WDNR Fisheries and Habitat – Poynette
Glenn Miller	Great Lakes Indian Fish and Wildlife Commission
Jeremy Pyatskowitz	Menominee Tribe
Henry Quinlan	USFWS - Ashland FRO
Don Reiter	Menominee Tribe
Jeff Roth	WDNR Fisheries and Habitat – Mercer
Ann Runstrom	USFWS - La Crosse FRO
Butch St. Germain	Lac du Flambeau Tribe
Karl Scheidegger	WDNR Fisheries and Habitat- Madison
Steve Schlimgen	WDNR Law Enforcement – Poynette
Steve Schram	WDNR Fisheries and Habitat – Bayfield
Steve Thompson	Winnebago Sturgeon Advisory Committee
Tom Thuemler	WDNR Fisheries and Habitat – Peshtigo
Larry Wawronowicz	Lac du Flambeau Tribe
Jack Zimmerman	WDNR Fisheries and Habitat - WI Rapids

*Once the plan was completed this group did not meet regularly and the last official meeting was in 2006. Moving forward, the Department used other methods to discuss sturgeon management issues with the public including Department-led informational meetings, fishing club meetings, Sturgeon for Tomorrow meetings and other groups. A team similar to the SMAT may be created to assist the Department in creation of the next Lake Sturgeon Management Plan.*

**b) Develop and implement local public involvement where necessary (Sturgeon Advisory Committee, Sturgeon for Tomorrow, etc.)**

*Review Comments:*

*While the Sturgeon Management Assessment Team has not met in recent years, Department staff have worked with other clubs and stakeholders to discuss sturgeon management. These clubs include:*

- 1) Winnebago Citizen Sturgeon Advisory Committee*
- 2) Sturgeon for Tomorrow – Winnebago*
- 3) Marinette- Menominee Sportsmen Club - Menominee River*
- 4) Wisconsin Conservation Congress*

*Over the last 15 years, these groups have assisted the Department in creating and advocating for a variety of regulations that insured the future for Lake Sturgeon in Wisconsin. These regulations include:*

- 1) Implementation of a 60" minimum length limit for hook and line fisheries*
- 2) Creation of a sturgeon spearing segregated fund for the Winnebago system*
- 3) Implementation of regulation changes for the Winnebago System spearing season including:*
  - a. Size limit changes*
  - b. Season harvest caps*
  - c. Reduced spearing hours*
  - d. Eliminating hook and line fishing and tackle in spearing shanties*
  - e. Lottery fishery on the Upriver Lakes*
- 4) Catch and release fishery below Grand Rapids Dam, Menominee River*

**c) Identify target audiences for sturgeon information, type of information and exchange needed, and develop appropriate educational materials to meet identified needs (e.g., video, posters, curricula, exhibits)**

*Review Comments:*

*Department staff have been working on a new Lake Sturgeon display for the Wild Rose Fish Hatchery education building that will inform visitors on the overall success of the Lake Sturgeon program and conservation efforts in Wisconsin. The display focuses on the role of the Wild Rose Fish Hatchery on the success of the program but also highlights conservation efforts in all areas of Wisconsin.*

*Staff also developed email distribution lists (Gov Delivery) to distribute sturgeon related information from the Winnebago System to interested members of the public. This includes daily harvest information during the spear fishery and daily updates during the spring spawning migrations. Sturgeon team members and*

*DNR biologists also collaborated on a magazine article describing hook and line angling opportunities in Wisconsin.*

*We have not specifically identified other target audiences for sturgeon information nor created a lot of educational materials, mainly due to shortages in staff and available budget. However, we have used opportunities at Conservation Congress, sport fishing and conservation club meetings, general interactions with the public, information on our website, and other methods to highlight the achievements of our sturgeon program in Wisconsin.*

**d) Create web page that will serve as a clearinghouse for sturgeon information and education in Wisconsin.**

*Review Comments:*

*The Department's website has a vast array of Lake Sturgeon web pages that provide key information to stakeholders about the current management status of sturgeon. While the information is available, the goal moving forward would be to organize the information in a more logical format. We have a webpage that is dedicated to the sturgeon spearing season and have a wide variety of pages on the sturgeon species present in Wisconsin, sturgeon spawning information, identification, distribution, habits and habitat, life cycle, fishing for sturgeon, environmental concerns and more. These pages can be accessed using the link below:*

*<http://dnr.wi.gov/topic/fishing/sturgeon/SturgeonInlandFishery.html>*

*<http://dnr.wi.gov/topic/fishing/sturgeon/SturgeonLakeWinnebago.html>*

**e) Produce annual sturgeon harvest and management report that includes information on spearing, hook and line, and tribal harvest**

*Review Comments:*

*The Department does produce annual sturgeon harvest and tagging summary reports for Lake Sturgeon assessments conducted on the Winnebago System:*

*<http://dnr.wi.gov/topic/fishing/sturgeon/SturgeonLakeWinnebago.html>*

*GLIFWC provides reports of their sturgeon harvest online:*

*<https://data.glifwc.org/reports/>*

*WDNR compiles harvest numbers each year for the inland hook and line season, and these numbers are reported below. We do not currently publish this information online, but this has been identified as a data sharing need.*

Hook and line lake sturgeon harvest for 2006-2016												
Water	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
St. Croix River	0	2	2	0	0	0	1	0	0	2	TBD	
Wisconsin River	2	13	2	6	10	15	12	10	6	10	10	
Chippewa River	57	4	11	6	9	13	12	14	19	4	8	
Flambeau River	65	6	3	4	7	5	3	8	12	7	8	
Yellow Lake	10	10	0	1	4	0	1	2	0	1	4	
Menominee River	1	1	1	3	1	1	1	2	0	2	0	
Lake Superior	0	1	2	1	0	1	4	1	4	12	16	

**f) Draft fact sheet of Sturgeon Management Plan to distribute with hook and line tag applications and sturgeon spearing licenses**

*Review Comments:*

*The Department did not create a fact sheet on the sturgeon species in Wisconsin to be distributed with the hook and line tag applications and sturgeon spearing licenses. A fact sheet can be produced for the updated plan if appropriate.*

**Medium Priority Recommendations:**

**g) Work with local interests to create Sturgeon for Tomorrow chapters throughout the state**

*Review Comments:*

*As the opportunity arises, Department staff have worked with local stakeholders to engage anglers and encourage them to participate in the management of sturgeon. We have not been the leading advocate for the formation of Sturgeon for Tomorrow Chapters. To date, 5 chapters of Sturgeon for Tomorrow exist, all of which are located around the Winnebago System.*

## **8.0 Commercialization, Privatization, and Scientific Use of Sturgeon Resources**

**Objectives:**

- 8.1 Minimize/eliminate potential problems and threats from aquaculture operations and scientific users.
- 8.2 Prohibit the importation and distribution of all sturgeon species as a hobby fish for aquaria.
- 8.3 Establish a cooperative partnership agreement between the Department of



Natural Resources, USFWS, Department of Agriculture, Trade, and Consumer Protection (DATCP), academia, tribes, other agencies, and the commercial aquaculture industry for the propagation of Lake Sturgeon, hereafter referred to as the Wisconsin Lake Sturgeon Aquaculture Agreement (WLSAA) using established technical criteria (from Objective 3.4) to assure the production of the highest quality product.

**High Priority Recommendations:**

- a) Restrict all sturgeon species propagation to DNR, USFWS, DATCP, tribal, academia, and commercial aquaculture under a WLSAA agreement for research and rehabilitation (statute change)**

*Review Comments:*

*WDNR and DATCP produced a report to State Legislature in 2000 entitled "Regulatory Options for the Commercial Rearing of Lake Sturgeon." The report outlined 5 different options for allowing private aquaculture to rear Lake Sturgeon ranging from status quo (private rearing prohibited) to repealing 95.60 (6)(a) to allow legal harvest, purchase, sale, barter, trade, possession, control and transportation of Lake Sturgeon by any farm registered with DATCP. Within the report, WDNR recommended Option #2 to allow private commercial aquaculture to participate in the rearing of Lake Sturgeon under a WLSAA for rehabilitation purposes only. DATCP recommended Option #4 to start a Wisconsin Lake Sturgeon Commercialization Pilot Project to explore the economic feasibility of private aquaculture. Any rearing of Lake Sturgeon by private aquaculture would require statutory change, which has not occurred. Thus, Lake Sturgeon rearing is currently limited to DNR, USFWS, Tribal, and Academia.*

- b) Prohibit live sturgeon and/or gametes on any license except under the WLSAA agreement**

*Review Comments:*

*See Section a)*

- c) Require a scientific collector permit application for those interested in collecting and conducting research on sturgeon. A complete study proposal or plan of work with the following sections should be submitted with the application: Background, Objectives, Approach, Expected Results, Application of Results, References, and Qualifications of Participants. Additionally, applicants will be required to submit annual reports on their progress and a complete report on their project results within 90 days of project completion. Applications will be reviewed by 1) the local fisheries biologist, and 2) the Sturgeon Management Assessment Team. Note: Research cooperators are expected to conform to above reporting standards**

*Review Comments:*

*Many research projects related to Lake Sturgeon have occurred in conjunction with DNR sampling, thus not requiring a SCP. Those projects that do require SCP have not gone through a standardized review process, but rather are reviewed by local biologists. Rarely have SCP permit applications been elevated to the level of the Sturgeon Management Assessment Team (SMAT). Further the SMAT has not actively met, rather the DNR Sturgeon Team (including GLIFWC representation) has met on a semi-regular basis.*



**d) Use technical criteria for propagation established in Objective 3.0 in the development of the WLSAA agreement.**

*Review Comments:*

*Legislation never passed to allow private rearing of Lake Sturgeon. See section a) for more details.*

**e) Determine current jurisdictions and authorities (no priority level identified)**

*Review Comments:*

*Joint management of WI/MI boundary waters with Michigan DNR and WI/MN boundary waters with Minnesota DNR. DNR Partners with USFWS and others on lake wide surveys of Lakes Michigan and Superior. Joint management of WI, MI, and MN Ceded Territory waters with GLIFWC Member Tribes.*

## **9.0 Management Plans**

### **Objectives:**

**9.1 Develop, implement, and update as needed a statewide sturgeon management plan for Wisconsin**

### **High Priority Recommendations:**

**a) Implement statewide sturgeon management plan**

*Review Comments:*

*The Department has implemented most of the current statewide sturgeon management plan and the review of that document is herein.*

**b) Develop and implement drainage and water specific management plans**

*Review Comments:*

*We have created specific management activities contained in various plans to address sturgeon management in specific waterbodies of the state. There are sections in the Menominee River and Lake Michigan Integrated Fisheries Management Plan that detail specific objectives and tactics to improve the sturgeon populations in those waters. Lake Sturgeon specific objectives are also identified in the Lower Wolf River Bottomlands Natural Resource Area Master Plan and the pending Wolf River Water Resources Management Plan. Planning is underway to implement a strategy in the 2015 Fishery Management Plan - Pike Lake Chain of Lakes to achieve its broader objectives for restoring biodiversity and reconnecting fragmented aquatic habitat in the South Fork of the Flambeau River. As other plans are developed, we will assure that sections are added to address Lake Sturgeon management interests.*

**c) Ensure sturgeon management recommendations are addressed in WDNR watershed or basin management plans**

*Review Comments:*

*Where appropriate, sturgeon management objectives and tactics are contained in a variety of watershed and basin management plans.*

- d) The Sturgeon Management Assessment Team should meet annually to assess implementation of Plan and conduct plan updates when necessary**

*Review Comments:*

*See Objective 7 for a complete description and history of the Sturgeon Management Assessment Team.*

**Medium Priority Recommendations:**

- e) Central Office fisheries liaison should be responsible for overseeing the implementation of the statewide sturgeon management plan and coordinating activities of the Sturgeon Management Assessment Team**

*Review Comments:*

*From 2000 – 2013, a Central Office fisheries staff person co-led the Sturgeon Team. From 2013 to present, the management of sturgeon has been implemented by the Sturgeon Team and the Fisheries Management Policy Team.*

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Appendix 1. Current statewide Lake Sturgeon monitoring efforts with designation of priority waters.

District	Management Biologist(s)	Waterbody	Station	Priority	Sampling Technique	Target	Frequency	Data Collected
West	Joseph Gerbyshak	Chippewa River	Jim Falls - Min Flow Unit	X	Dip Net Spawning Survey	Spawning stock	Annually given spawning run strength	Length, weight, sex, tag information
West	Joseph Gerbyshak	Chippewa River	Dells Dam in Eau Claire	X	Prespawn Gillnet Survey/ H&L	Juveniles/Adults	Annually depending on flow conditions	Length, weight, sex, tag information
West	Joseph Gerbyshak	Chippewa River	Chippewa Falls Flowage - DS Lake Wissota Dam	X	Postspawn Gillnet Survey	Juveniles/Adults	Annually depending on flow conditions	Length, weight, sex, tag information
West	Joseph Gerbyshak	Chippewa River	Cornel Flowage - downstream of Lake Holcombe Dam		Postspawn Gillnet Survey	Juveniles/Adults	Intermittently	Length, weight, sex, tag information
West	Joseph Gerbyshak	Chippewa River	Jim Fall Power House		Postspawn Gillnet Survey	Juveniles/Adults	Annually depending on flow conditions	Length, weight, sex, tag information
West	Vacant	Wisconsin River	Stevens Point Flowage - Downstream of Dubay	X	Spring Electrofishing	Juveniles/Adults	Annually	Length, weight, sex, tag information
West	Jennifer Bergman	Wisconsin River	Petenwell Flowage - Nekoosa	X	Spring Electrofishing	Juveniles/Adults		Length, weight, sex, tag information
West	Vacant/Bergman	Wisconsin River	Stevens Point and Petenwell Flowages		Fall gillnetting	juveniles - 18-50"	Discontinued 2006-2015	Length, tag information
West	Pat Short	Mississippi River	Pools 9-12		Incidental catch via shovelnose	Adult Shovelnose	Discontinued 2002-2007	Length, tag information

					trammel and hoop/buffalo net			
District	Management Biologist(s)	Waterbody	Station	Priority	Sampling Technique	Target	Frequency	Data Collected
West	Dan Hatleli	Black River	Downstream of Black River Falls Dam	X	Electrofishing/ Hook and line	Juveniles/Adults	When flow conditions allows; spring or fall	PIT and floy, lengths
West	Vacant	St. Croix River	St. Croix Falls	X	Dip Net	Juveniles/Adults	Annually	Length, weight, tag information
West	Vacant	Red Cedar River	Menomonie	X	Dip Net	Juveniles/Adults	Annually	Length, weight, tag information
East	Ryan Koenigs	Winnebago System	Winnebago System Tributaries (Wolf, upper Fox, Embarrass, Little Wolf Rivers)	X	Dip Net Spawning Survey	Adults	Annually	Length, sex, tag information
East	Ryan Koenigs	Winnebago System	Lakes Winnebago, Butte des Morts, Poygan, and Winneconne	X	Harvest Assessment	Juveniles/Adults	Annually	Effort, harvest, length, weight, sex/maturity, age diet, tag information
East	Chip Long/Mike Donofrio	Menominee River	Lower Menominee River	X	Electrofishing	Juveniles/Adults	Annually depending on flow conditions	Length, weight, sex, girth, tag information
East	Chip Long/Mike Donofrio	Menominee River	Upper Menominee River	X	Electrofishing	Juveniles/Adults	Annually depending on flow conditions	Length, weight, sex, girth, tag information
North	Paul Piszczek	Lake Superior			Gillnetting			
North	Jeff Scheirer	Flambeau River	Impoundments, tailwaters, free-flowing	X	Gillnetting	Juveniles/Adults	Annually	Length, weight, tag information



			segments on mainstem and North and South Forks					
<b>District</b>	<b>Management Biologist(s)</b>	<b>Waterbody</b>	<b>Station</b>	<b>Priority</b>	<b>Sampling Technique</b>	<b>Target</b>	<b>Frequency</b>	<b>Data Collected</b>
North	Jeff Scheirer	Chippewa River	Arpin Dam tailwaters		Dip-netting w/suspended discharge	Juveniles/Adults	Annually depending on flow conditions	Length, weight, tag information
North	Jeff Scheirer	East Fork Chippewa River	All natural lakes	X	Gillnetting	Juveniles/Adults	Annually	Length, weight, tag information
North	Zach Lawson	North Fork Flambeau River	Turtle-Flambeau Flowage, free- flowing segments, and all natural lakes upstream	X	Gillnetting	Juveniles/Adults	Annually	Length, weight, tag information
North	Zach Lawson	Manitowish River	Turtle-Flambeau Dam tailwaters		Dip-netting w/suspended discharge	Juveniles/Adults	Annually depending on flow conditions	Length, weight, tag information, gamete collection
South	Nathan Nye	Wisconsin River	Wisconsin River at Dells Dam tailrace	X	Spring Gillnetting and Electrofishing	Spawning stock	Annually, exact dates determined by temperature and flow	Length, weight, sex, tag information, adults for gamete collection
South	Nathan Nye	Wisconsin River	Wisconsin River, Prairie du Sac Dam tailrace	X	Fall Gillnetting	Adult fish post H&L season	Annually; October 1 through mid-late November	Length, weight, tag information; generate adult PE and exploitation rate

## Appendix 2. Lake Sturgeon Stocking Summary

Please see stocking summary here: (**NOTE:** *We will reformat and include within document or post public link when this goes out for public review*):

[\\central\water\FH\\_PROJECTS\FM\\_Sturgeon Team\Appendix2\\_StockingSummary.xlsx](\\central\water\FH_PROJECTS\FM_Sturgeon Team\Appendix2_StockingSummary.xlsx)

### Appendix 3. Lake Sturgeon Regulations Timeline: 1935-2014

**NOTE:** *This appendix is over 30 pages in length. We have provided a link to this material on the fileshare for internal review purposes, and will make this public for the public review period:*

[\\\\central\\water\\FH\\_PROJECTS\\FM\\_Sturgeon\\_Team\\Appendix3\\_SturgeonRegHistory.pdf](\\\\central\\water\\FH_PROJECTS\\FM_Sturgeon_Team\\Appendix3_SturgeonRegHistory.pdf)

## Appendix 4. Outreach materials created for sturgeon populations and harvest opportunities information since the 2000 Lake Sturgeon Management Plan.

### Year Specific Outreach Materials:

- a) 2004 registration information handout for southcentral region (<\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\SturgeonTaggingRegistering2004.pdf>)
- b) 2005 registration information handout for southcentral region ([\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\SCR\\_regstats.pdf](\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\SCR_regstats.pdf))
- c) Spring hearing handout 2006 ([\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\06springhearing\\_fsheetsheet.pdf](\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\06springhearing_fsheetsheet.pdf)) with regulation option insert ([\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\regoption\\_fsheetsheet.pdf](\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\regoption_fsheetsheet.pdf))
- d) Regulation change proposal, June 2008 (<\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4\\LegislativeRulebriefJune08.pdf>)
- e) 2008 regulations handout (<\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\sturidregs.pdf>)

### General Outreach Materials:

- f) Gut Contents poster (<\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\gutposter.pdf>)
- g) Sturgeon Distribution leaflet ([\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\shovlakestur\\_dis.pdf](\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\shovlakestur_dis.pdf))
- h) Species Comparison leaflet ([\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\shovlnoselake\\_comp.pdf](\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\shovlnoselake_comp.pdf))
- i) Shovelnose Sturgeon Distribution map (<\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\ShovSturDistWI.pdf>)
- j) How to sample a sturgeon (<\\\\CENTRAL\\WATER\\FH PROJECTS\\FM Sturgeon Team\\Appendix 4 Materials\\stursample.pdf>)